"Why the time is NOW for major changes within the Pulp and Paper Industry"

Del Raymond
Weyerhaeuser

Del Raymond is currently the Director of Strategic Energy Alternatives for Weyerhaeuser Company.

Dr. Raymond joined Weyerhaeuser Company in 1977 as Manager of the Energy Department where he was instrumental in the initial organization and growth of that department. He was named Director of the new Energy & Environment Division in 1981, Director of Equipment & Process Technology in 1986, and General Manager of the Sensor & Simulation Products Division in 1989. He was named to his present position following the completion of the sale of the Sensor business in 1991.

Prior to joining the company, Dr. Raymond was Director of Chemicals, Energy, and Effluent Technology with St. Regis Paper Company (now Champion International) in West Nyack, New York.

Dr. Raymond earned his B.S., M.S., and Ph.D. in Chemical Engineering at the University of Maine in Orono, Maine. He is a Co-Chairman of the American Forest & Paper Association Steering Committee for Agenda 2020 and the Recovery Boiler Committee, a director of the University of Maine Pulp and Paper Foundation, and Past Division Chairman of the Forest Products Division of the American Institute of Chemical Engineers.

Among his several past awards, Dr. Raymond was named by the University of Maine Pulp and Paper Foundation to receive its 1981 Honor Award in recognition of his work to enhance the reputation of the University for training people to enter technical careers in the paper and related industries. He also received the Distinguished Engineering Award from the University of Maine in 1993. He received the President's Award from Weyerhaeuser Company in 1987 for his efforts in forming a new division of the company, and again in 1997 for leading the Agenda 2020 industry technology visioning process.

Energy Performance Workshop

Cincinnati, Ohio

September 1, 1998

Paper Industry - Today

- The Industry is:
  - a worldwide leader
  - globally competitive
  - an important contributor to the Nation's economy
- Ranks among top 10 manufacturing industries
- Nearly 30% of world production - over 95 million tons per year

Paper Industry - Today

- Larger than the sum of the next four countries combined
- Over 9.2 million metric tons in exports
- Third largest consumer of energy
- Over 56% energy self sufficient
- Highest in capital intensity

Paper Industry - Today

- Added capacity greater than any other country's entire capacity
- Employment - 1.6 million
- Product value - $230 billion per year
- 45% (45.2 million tons) recovered for recycling

Industry Pressures

- **Loss of technology leadership**
- Emphasis on environmental priorities
- Cost of energy & dependence on purchased power
- Government response to greenhouse gas issues
- Increasing capital intensity
- Aging of powerhouses

Industry Pressures

Loss of Technology Leadership

- Majority of new innovations over last 30 years from non-US sources
- Low cost fiber supplies moving to southern hemisphere
- Majority of capacity growth is off shore
- Newest technology being implemented in off-shore mills

Industry Pressures

- Loss of technology leadership
- **Emphasis on environmental priorities**
- Cost of energy & dependence on purchased power
- Government response to greenhouse gas issues
- Increasing capital intensity
- Aging of powerhouses

Industry Pressures

Emphasis on Environmental Priorities

- Industry's approach to environmental priorities over last 30 years - unprecedented
- Exemplary results but with significant capital cost
- Significant additional expenditures in our future
- Continuing need for more environmentally compatible technologies

Industry Pressures

- Loss of technology leadership
- Emphasis on environmental priorities
- **Cost of energy & dependence on purchased power**
- Government response to greenhouse gas issues
- Increasing capital intensity
- Aging of powerhouses

Industry Pressures

Cost of Energy & Dependence on Purchased Power

- Low energy cost has been a basis for competition in the past
- Current prices appear stable but .....
- Forest products industry is nearly 60% self sufficient and could be more
- Steam power balance in most plants is drifting toward more purchased power
- Future cost of power is uncertain

Industry Pressures

- Loss of technology leadership
- Emphasis on environmental priorities
- Cost of energy & dependence on purchased power
- **Government response to greenhouse gas issues**
- Increasing capital intensity
- Aging of powerhouses

Industry Pressures

Government Response to Greenhouse Gas Issues

- The industry's level of self sufficiency may be an advantage
- IGCC technologies could:
  - Reduce carbon emissions by more than 30 million metric tons per year
  - Produce in excess of 30 gigawatts of renewable power

Industry Pressures

- Loss of technology leadership
- Emphasis on environmental priorities
- Cost of energy & dependence on purchased power
- Government response to greenhouse gas issues
- **Increasing capital intensity**
- Aging of powerhouses

Industry Pressures

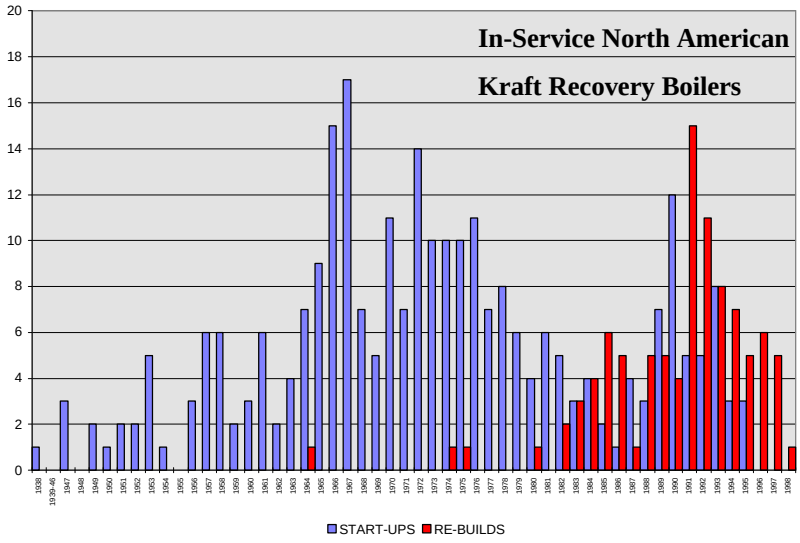
Increasing Capital Intensity

- Capital intensity compared to other industries
- Rate of increasing capital intensity

Industry Pressures

- Loss of technology leadership
- Emphasis on environmental priorities
- Cost of energy & dependence on purchased power
- Government response to greenhouse gas issues
- Increasing capital intensity
- **Aging of powerhouses**

The Window of Opportunity



Turning Pressures into Opportunities

- The U.S. forest products industry must regain its technology leadership
  - Agenda 2020 – a start in that direction
  - More will be necessary
- Future environmental priorities must be achieved without the anticipated cost
  - Innovative solutions that provide associated benefits
  - New technologies opportunistically deployed
- Ability to utilize renewable energy must be exploited
  - Improved energy efficiency
  - Increased energy production

Turning Pressures into Opportunities

- Opportunities to positively impact global climate issues must be quantified and effectively pursued
  - Forestry
  - Products
  - Fossil fuel displacement
- Capital intensity must be reduced
  - Increased production from existing assets
  - Lower cost for replacement technologies
- As powerhouse infrastructures need replacement, more efficient and lower capital technologies need to be utilized
  - Biomass gasification combined cycle
  - Black liquor gasification combined cycle